Errata Corrige

Hard Real-Time Computing Systems: Predictable Scheduling Algorithms
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- On page 23, Figure 2.2 should not have *vertical lines*, and the value $\sigma(t)$ of the schedule function in a context switch time t is equal to $\sigma(t + \varepsilon)$. A similar problem occurs in Figures 2.3, 2.15(d), 4.14, 4.17, 5.3, 5.4, 5.5, 5.6, 5.7, 5.11, 5.12, 5.13, 5.17, 5.18, 5.19, 5.21, 5.22, 6.1, 6.2, 6.3, 6.4, 6.14, 7.6, 7.7, 7.8, 7.12, 7.19, 8.5, 8.6, and 8.10.

- On page 25 (last line of the second last paragraph), in the sentence "whereas an aperiodic job by J_i", the word "job" should be replaced by "task".

- On page 34, the arrow labeled "preemption" in Figure 2.12 points to the wrong state. It should go from RUN to READY.

- On page 41, below the header "PRECEDENCE CONSTRAINTS WEAKENED" there is a typo: rather than removing the precedence relations between task J_4 and tasks J_5 and J_6, these precedence relations are kept (and those between task J_4 and tasks J_7 and J_8 are removed).

- On page 43, in Section "ANOMALIES UNDER RESOURCE CONSTRAINTS", the (relative) priorities of the tasks are lacking. Similar to the example started on page 39, tasks are assumed to be sorted by decreasing priorities.

- On page 73, the term *release jitter* is not appropriate and should be replaced with *start time jitter*.

- The example on page 98-100 contains a number of errors.

  - The iteration steps to determine R_4 on p. 100 do not conform to the description of the calculation of R_i on p. 98. This problem finds its cause in a partial update from the first towards the second edition, where the calculation has been updated, but the iterative steps to determine R_4 has remained unaltered. Please note that the final result found for R_4 is correct.

  - The value for $I_4(3)$ is 8 (rather than 7, as given in the book).

  - In Figure 4.14, the term f_4^k is not defined and is meant to be equal to $I_4(k) + C_4$. The figure is meant to show I_4 as a function of t, i.e. $I_4(t) = \sum_{j<i} \lceil t/T_j \rceil$. Since this is a function, vertical lines should not be there. Finally, for $t = 0$, it should be $I_4(0) = 0$ and $I_4(t) = 4$ for $t \in (0, 4]$.

- In Chapter 5, it is worth observing that the schedulability analysis of fixed priority servers, although carried out with the Liu and Layland method, can also be performed using the Hyperbolic Bound approach [1] or the Response Time Analysis [2]. See the related papers for more details.

- In Section 5.3.2, when computing the response time of an aperiodic job under the Polling Server, there is a problem for situations where $C_a = kC_s$, where $k \in \mathbf{N}^+$. In that case, $F_a = k$ and $R_a = 0$! The formula for F_a should therefore be: $F_a = \lceil C_a/C_s \rceil - 1$. For the special case where $C_a = kC_s$, R_a will then become equal to C_s, leading to the right result.

Solutions to exercises

- Solution to Exercise 3.4 (p. 376) contains two errors:

  - Based on the heuristic function $H = a + C + D$, the schedule found is $\{J_2, J_4, J_3, J_1\}$ (rather than $\{J_2, J_3, J_4, J_1\}$, as mentioned in the book).

  - As illustrated in Figure 12.2, there is only one feasible schedule, i.e. $\{J_3, J_2, J_4, J_1\}$. This schedule can be found by using the heuristic function $H = a + d$, and not $H = a + D$.

- The solution to Exercise 6.6 on p. 388 contains two errors:

$$d_1^{(2)} = f_1^{(1)} = 5$$
$$d_1^{(3)} = f_1^{(2)} = 4$$

- The solution to Exercise 7.5 on p. 391 contains an error: D_3 cannot potentially block τ_1, because τ_1 does not use resource D. This does not change the numerical result of the exercise.

References

[1] E. Bini, G. Buttazzo, and G. Buttazzo, "Rate Monotonic Analysis: The Hyperbolic Bound", IEEE Transactions on Computers, Vol. 52, No. 7, pp. 933-942, July 2003.

[2] G. Bernat and A. Burns, "New results on fixed priority aperiodic servers", Proceedings of the 20th Real-Time Systems Symposium, pp. 68-78, December 1999.